437 They have sold the new small canoes, tree bark mats
[501 (damajaguas), palm-leaf fans, rubber and rolls of liana (these are
285 used in the construction of bamboo huts to tie up the palm-leaves
●283] on the [284] roofs and for some other purposes in lieu of string),
which they have brought from the villages and with the cash they
have earned they now make their small purchases. They have
few wants and do not need much: a few feet of cotton cloth, a
chopping knife, some salt, a small mirror, glass beads, fish hooks,
[411] powder and small shot for the old muzzle-loader which a few of
them may own. This would be all their heart desires. It is little,
even very little, and yet it takes long, even very long, until they
have made their choice and finally decided to buy. First they
talk it over among themselves in their guttural and sonorous lan-
guage and then they start bargaining, and then they count out their
money slowly and cautiously; finally having managed to get the
[462] desired goods, they packed them into the nearly full basket car-
ried by the wife. The women and girls timidly hide behind their
576 menfolk. When spoken to, they do not answer, although they
571 understand sufficient Spanish. Their jealous menfolk have strictly
[191] forbidden them to enter into conversation with men of other races
or tribes. They draw back bashfully. But if the husband is not
present, only the mother or brother, the women become very
loquacious, especially when their tongue has been untied by a
small present—a mirror, necklace or something of the kind. And
they are happy beyond words if you caress their little child, who
looks like a Japanese baby painted brown, and has a friendly smile
even for a stranger. It is amusing to watch the women meeting a
fashionably dressed lady in one of the shops; then they surround
her laughing, amazed and admiring, but they do not appear to be
jealous of the lace dresses worn by European women. The men,
on the other hand, do not honor even the most beautiful and most
elegant white lady with so much as a glance.

142 The Cayapa girls are pretty from the age of 12 to 16 years,
302 their bodies somewhat plump, but still with a beautiful shape.
584 Sometimes young men and women can be seen with red and black
streaks and dots on their faces, chest, arms and legs; this is a
sign that they are engaged.

505 Once their business in town is finished they prepare for the re-
turn journey to their villages. "Adios compadre, adios compadres,"
and chattering and laughing, happy and content, they hurry to
the shore where their canoes are moored. On their way they

3: Barrett E-5 (1908-1909)1925
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front. In such cases, sometimes the belt is placed outside the two garments, but more frequently it binds the under-garment only, the ends of the light outer garment being merely tucked under the belt at the front. This outer skirt is very frequently of calico or other light cloth, and is in no way essential to the dress. It may, however, be a second manta, and as large and heavy as the main under-garment. In pls. XIX, XXI, XXII, are shown women wearing the single manta; in pl. XX is presented an instance in which a second outer manta is worn with its corners tucked under the belt at the front, and in pl. XXIII the larger of the two girls wears in a similar manner an outer garment made of calico.

Ordinarily, children up to the age of six, and sometimes even up to ten years, wear no clothing at all. Usually, however, a girl begins to wear her manta, and the boy a short calico shirt, at the age of six or eight years; but the boy does not put on a clout until later, often not until about the age of twelve. On the other hand, frequently very small children, even those two or three years of age, are provided with clothing which they wear in imitation of their elders on gala occasions.

Practically the only time that babies are clothed at all is while sleeping; they are then tightly wrapped and bound in cloth, but without a cradle-board or a basket. They are placed crosswise in a hammock provided with a mat or a piece of bark cloth to hold it open and thus to form a kind of cradle. At one side of the hammock is attached a long braided string, made from the young leaf of a certain species of fan-leaf or from an ordinary

3: Barrett E-5 (1908-1909)1925
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354 twisted string of pita, by means of which one of the older
[283] members of the family, while performing some other task, keeps the hammock swinging.

302 Aboriginally both men and women wore long loose hair, without braiding or other special mode of dressing; but now long hair is worn only by the women, the men keeping their hair cut short. Some of the women cut the front hair even with the eyebrows, otherwise their hair is never cut, nor is it dressed in any special fashion, being simply parted in the middle and allowed to fall loosely over the back and breast. The only time that the hair is ever worn otherwise is when a woman is engaged in some very hot work; it is then often coiled up on the head or tied in a large knot at the back. The hair of little girls is never cut, but that of boys is cut when they are very young. As a rule the men have no special mode of dressing the hair; it is simply kept cropped to an even length all round, and is allowed to grow from the crown straight down in all directions, without parting or other training. Now and then a man may part his hair in the middle, but this practice is exceptional. These styles of hair-dressing are shown in pls. XVI–XXXVIII.

A characteristic feature of Cayapa life is the custom of painting the face and other exposed parts of the body with red, yellow, and black pigment, and in many different designs. The red and yellow pigments, called in
302 824 Cayapa mū' and la''mū' respectively, are derived from the seed-pods of a small shrub known by the colloquial Spanish name achote and by the Cayapa name can-

3: Barrett E-5 (1908-1909)1925
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PITA LEAVES FOR MAKING CORD

3: Barrett E-5 (1908-1909)1925
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The crisp, pure white, young leaves from the center of the crown of this palm are much esteemed as a food by the Cayapa. To secure these, however, it is necessary to cut down the whole plant, which is done with a machete or preferably an ax. The large, mature leaves of the crown are cut and pried away until the inner part of the trunk is reached. These outer, old leaves of the crown are even more fibrous and resistant than the trunk itself, and as it is almost impossible to cut them away with a machete, an ax is usually necessary. Owing to their great weight, and especially to the interlacing of the hard and very strong fibers at the bases of the leaves, a couple of chisel-pointed sticks, six feet or so in length, are needed to pry away the outer leaves after the mid-ribs have once been cut through with the ax. This inner trunk and those inner leaves which have already begun to unfold are next cut away, until the very young, succulent leaves, which as yet have not commenced to unfold and which appear in the form of a solid, slender cone of pure white, are reached. This cone often measures at its base as much as ten to fifteen inches in diameter, and may be even ten or twelve feet in length. It is a solid mass of crisp white matter, finer in texture than the innermost part of a head of cabbage and with a flavor resembling that of almonds. It is ordinarily eaten raw, either with or without salt, although a very good dish is also prepared by boiling it.

The palma real yields another useful product. The tough fibers, called niñtcū'a, which grow along the sides of the base of the mid-rib of the mature leaf, and which,

3: Barrett E-5 (1908-1909)1925
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as above mentioned, interlace with the fibers of adjoining leaves in such manner as to make it necessary to pry the leaves apart with wooden bars, are strong and pliable, and are woven into burden-bands by which heavy loads are carried. These fibers often attain a length of about four feet and are possessed of tensile strength sufficient to enable their use as strings on the wooden harp which is now made to a very limited extent by the Cayapa. This instrument was borrowed by them from the Indians of the interior, who in turn copied it from the Spanish conquerors.

Another palm, found to a limited extent along the river, is the coconut, called after the Spanish, kō′kō-tcī. It does not, however, thrive at any considerable distance from the ocean, consequently few palms are found even at so short a distance up the Rio Cayapas as the mouth of the Onzole. Pl. CXXXI presents a view looking up-stream at the confluence of the Rio Onzole with the Rio Cayapas, and, upon the projection of land between them, the hacienda of one of the more prosperous of the negroes of the region. Several coconut palms appear in front of the house. Coconuts grow well along the immediate coast, and there are here large groves, the nuts being shipped to nearby villages and to points even as far away as Esmeraldas. They are purchased to a certain extent by the Indians, by whom they are used in very limited quantities as food, more especially for the so-called coconut-milk which is made from the ripe nuts.

In addition to the foregoing food-producing plants,

3: Barrett E-5 (1908-1909)1925
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these acts, combined with the spraying and smoking, gradually drive the spirits from the locality.

Another important product of this region is pita, called sa'nō, by the Cayapa, a plant resembling somewhat the yucca of the Southwestern desert region of the United States, but with leaves which sometimes reach a length of fifteen or sixteen feet. It is usually grown at some distance back from the river, and seems to thrive best in the dense shade of the jungle. When once well started it requires very little attention other than the cutting away of undergrowth and clearing of the field which is incidental to the harvesting of the leaves. These leaves yield long, very strong fibers, called sañ bu'tyū, which are twisted into two-ply strings. These are much used in net-making, in binding the selvage of textiles, for fish-lines, and for a variety of other purposes where very strong cord is required. The leaves are cut close to the ground and brought to the house in bundles such as those illustrated in pl. LXVI, where a large and a small bundle of the freshly cut, long leaves are shown leaning against the side of the house. Each leaf yields a large number of fibers, the laborious preparation of which will be discussed in speaking of string-making.

While pita is the strongest material and is considered the best from all points of view, there is another material, called in the local Spanish cosadera and in Cayapa señgi'lya, which is used especially where string or rope of large diameter and of moderate strength is desired, such as for hammocks. This material is derived from the bark of a tree and is obtained by heating in a manner

3: Barrett E-5 (1908-1909)1925
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similar to that used in making the bark cloth of the region. When the fibers are beaten out and prepared for twisting into cordage, they are usually stored away in bundles, such as that shown in pl. CXIX, 2, until needed.

An important economic plant of the Cayapa country is that from which is made the bark cloth called by the local Spanish name damajaua and by the Cayapa name tû′ckī. This is beaten from the bark of an indigenous tree called tû′ckītcī. The tree is felled and a section of the bark the length desired, usually six to eight feet, is carefully removed, being split along one side only. The bark may then be beaten immediately upon the same log, but it is ordinarily rolled up and taken to the house where a log is kept especially for this beating, which is done with a short maul, called tatcī wīma′so, such as that shown in fig. 6. One side of the maul, at least, is cut diagonally with grooves and corresponding ridges. The beating must be done within a few hours after the bark is taken from the tree, or before it dries considerably. Placing the strip of bark crosswise upon the log, it is beaten with considerable force with the grooved side of the maul, which is held at an angle of about forty-five degrees to the length of the bark. After beating one short section of the bark in this manner, it is moved across the log far enough to bring a new section into place, and in this way every part of the bark is reached.

FIG. 6.—Beater for bark cloth

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At the present time the hook-and-line is very much used in fishing, though this was introduced by the whites. Strong, slender, fish-poles, called wañgū-tca′lī, seven to ten feet in length, are made from the upper branches of the large bamboo. They are gathered when thoroughly matured but while still green, and are hardened and straightened by heating. The lines, called wañgū-tcū′a, or sañ-dō′a, are made of native pita string and are usually quite fine. The strength of the pita fibers makes it possible to use a very fine line for comparatively large fish. Such a fish-line, provided with a special pottery sinker and an ordinary steel fish-hook, is shown in fig. 9; it is wound in this case on a cylindrical piece of balsa. This line is called tcūndyē′pū and is used in the hand after the fashion of a troll. In case it should be dropped or pulled overboard, it is saved by means of the balsa float. Ordinarily all lines are provided with lead sinkers, but the pottery cylinder especially made as a sinker is an old type and was formerly very much used. Hooks, called weñgō′la, are now obtained from traders at the coast, although it is

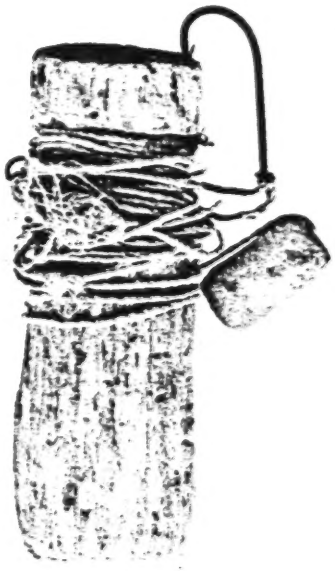

FIG. 9.—Fish-line with pottery sinker

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cloth, and is placed near the opening at which the bees enter and leave the tree or log. The smudge apparatus is then fanned until a volume of smoke is produced, which in time drives away or stupefies the bees and makes possible the taking of the brea. The wax is found in large blocks, usually at the bottom of the nest, and is cut out with an ax or a machete. It keeps indefinitely, and is stored either in the house or is buried in the ground until needed.

Shortly before or sometimes just after painting the canoe with brea, a hole is cut in the middle of the prow at a point just back of the slightly raised transverse line upon its upper surface, for the cable by which the canoe is moored. This cable, called kondō′pī, consists usually of from two to four strands of carefully selected pitigua twisted together. Such a cable of three strands is shown in pl. XCI, 1. The length of the cable usually varies according to its diameter and the number of its strands, governed by the size of the canoe for which it is made. For very small canoes, frequently a single strand of pitigua is sufficient, but in most cases a two-strand cable is required; very large canoes have three-strand and sometimes even four-strand cables. In making a cable it is necessary first to twist each of the pitigua strands separately, the bark of the strands first having been removed. By means of this twisting the strand is rendered pliable, as well as stronger, since the fibers, which ordinarily would be parallel, are forced to twist around one another. The twisted strand is now wound round a hooked stick, such as that used in cleaning the

3: Barrett E-5 (1908-1909)1925
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283 cane and plantain fields, and is allowed to dry for a few hours, usually over night. The two or more strands to be twisted into the cable are next tied in a simple knot at one end and the strands passed, one or more, on each side of an upright support. Six or eight feet of pitigua are then unwound from the hooked sticks, and each stick is taken by a person and the pitigua twisted, all strands, of course, being twisted in the same direction. After a sufficient amount of torsion has been secured in these strands, another person takes up the knotted end of the cable and begins to twist the strands together on the opposite side of the upright. In reality he does not himself twist these strands together—he merely pulls sufficiently to bring them out on his side of the upright so that the accumulated force of torsion in the separate strands twists them together into a two- or three- or four-ply cable, as the case may be. This is done very slowly, the worker twisting and pulling here and there in such manner as to cause the strands to twine round one another evenly, producing a cable of uniform size and strength throughout. The strands are unwound from the hooked sticks as rapidly as they are twisted together on the opposite side of the upright, until finally, when the ends of the strands are reached, the cable is prevented from untwisting by another simple knot or by a more or less intricate weaving of smaller strands of pitigua about the main strands of the cable, as shown in the illustration above mentioned and in a manner similar to that represented in greater detail in pl. CIII, 19, 20. This last is the more usual form of

3: Barrett E-5 (1903-1909)1925
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securing this end of the cable, since it is necessary to have one end small in order to pass it through the opening in the prow of the canoe or for whatever other purpose it may be used. Ordinarily the cables are not tied about the prow of the canoe, but are simply passed up through the hole in the prow above mentioned, the knot in the cable below the prow holding it securely.

For ordinary purposes of travel and for carrying regular loads the canoe above described is sufficient. If, however, an excessively heavy or bulky and unstable cargo is to be transported, it is necessary to increase the buoyancy or to steady the canoe by means of outriggers, called by the Spanish name balsas, Cayapa na'na. In this region the term *balsa* has four significations. It is primarily a raft or float of any kind, and is the term naturally applied to the rafts of logs or bamboo which the Indians float down the river for sale at the settlements. The same term is applied to the outriggers used on canoes, as also to the tree and its wood from which these are made. This wood is very light, even when green or water-soaked, and when dry it is as light and soft as cork, qualities which make it very useful in numerous ways. The chief uses of balsa wood, however, are due to its buoyancy: it will carry in water much more than its own weight, and it is therefore used in rafting such heavy timber as guayacan. In this process, as many logs of balsa are procured as are necessary to sustain the weight of the guayacan, and these are lashed together into a float, the guayacan timbers being lashed on top of them. The guayacan timbers

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In the second class of material may be included the thin bark of five species of endogenous plants: rampile, hoja blanca, hoja negra, chocolatilla, and crinande, which are used for making the lighter and less durable baskets, especially the hamper-shape baskets such as those shown in pl. XCIII, 2, 5, 6, 10, 11, as well as diminutive trinket baskets like those in figs. 15–17 (pp. 200-201). These materials, especially rampile, are used also in making baskets of other forms, but requiring no great durability or strength. Baskets of this class are shown in figs. 7–9 of pl. XCIII. Rampile is also extensively employed in making fans and mats. In the third class of materials is the leaf of the palm known in Spanish as chapil, sometimes also called milpeso, and, by the Cayapa, kūla′pō. Two forms of basket, one conical, the other square-sided (pl. XCII, 2, 5 respectively), are made of this material. Such baskets are suitable only for temporary use, since after a day or two the material becomes dry and brittle; while green, however, it is pliable and fairly strong. The conical basket (fig. 2) serves a ceremonial as well as a utilitarian purpose, being employed by shamans in their medicine practices.

The most important of the various basketry materials is the pitigua. This durable fiber is derived from the long roots of a single species of aerophitic plant which usually grows in the upper branches of trees and sends its long, slender roots to the ground. Pitigua is much sought for various purposes by the negroes and whites of the region, as well as by the Indians, so that along the lower course of the Rio Cayapas it has become somewhat scarce. When the plant is found, however, its roots are

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easily gathered, since by simply pulling on them they usually break off at or near the plant itself, and often a root seventy-five or even a hundred feet in length is obtained. It is employed not only for basket-making but for many other purposes, such as for binding together the parts of a house-frame (figs. 2–5), for binding the palm-leaf thatch upon the roof (pl. VII), and indeed wherever material for tying or binding is needed. It serves also the many purposes for which civilized people use string and rope, as for mooring canoes, securing animals, etc. Pitigua fiber is practically indestructible so far as dampness is concerned, and may even be kept wet for a considerable time without rotting. If kept from direct contact with water, however, it will last for years even in this humid climate, as is shown by the bindings on the frames of some of the Cayapa houses that have been in use for ten or fifteen years at least.

When gathered these roots are usually made up into large coils (pl. XCI, 4) and laid away in a dry place until needed. To render them pliable they are soaked over night in the river. In two forms of baskets the warp elements are made of the smaller whole roots of the pitigua, otherwise the material is always split into strips or splints, which are prepared as follows:

The bark of the root being first removed, its inner woody portion is split into long, thin ribbons. The individual fibers of the root are extremely long and straight, hence when once started a ribbon can be split the full length of the root with almost perfect evenness. Usually one end of the root is taken up and split with a knife or machete, for a distance of an inch or two, into

3: Barrett E-5 (1908-1909)1925
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ROPE COILS AND BRUSHES

[p. 186 (A)]

3: Barrett E-5 (1908-1909)1925
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[p. 190(a)]

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any other articles of value he does not deem it safe to leave at home.

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These hampers, especially when used in traveling, are tied about the middle with a cord or a woven band, and can be tumbled about without danger to their contents. They are frequently kept filled with articles in storage in the loft of the house, and often are suspended by the above-mentioned cord or band from the rafters or from one of the timbers at the eaves. Sometimes these baskets are made for special purposes. This is the case with the long one shown in pl. XCIII, 2, which was made especially for the storage of spindles, though the usual spindle storage-basket is a long tubular one like those shown in figs. 8 and 12 of the same plate. Another special form is the very small hamper-shape basket, such as those shown in figs. 15–17; these are used as receptacles for trinkets.

[227]

The bottle-shape bait basket, tū′ñūtcītcī (pl. XCIII, 3), is a very specialized form and, as its name implies, is made for the particular purpose of carrying live insect bait in the canoe while fishing. Its narrow neck is provided with a balsa stopper or with some leaves made into a bundle which serves the same purpose.

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Tubular baskets, called tcūrūkū′kū (pl. XCIII, 8, 12), are made especially for the storage of spindles, either full or empty. These baskets are usually from thirty to forty centimeters in length by from seven to fifteen centimeters in diameter. Such a basket is hung by one edge of its opening, so that it hangs at more or less of a slant. It is usually suspended from a rafter or other part of the house-frame near the eaves, within easy

3: Barrett E-5 (1908-1909)1925
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283 285 415 reach from the floor. The Cayapa women are very industrious, and whenever not occupied about the daily routine of their houses and fields, are spinning and weaving. The spinning tripod (pl. CVIII) is always kept in a convenient place at one side of the house, and one or two spindles are usually kept on the small woven shelf near the bottom of the tripod. All extra spindles, whether empty or filled, are, however, kept in these long tubular baskets. When several spindles are filled they are emptied by winding the thread into balls, in which form it is stored until needed.

231 285 One very special form of basket not mentioned in the tabulation above is the large bottle-shape basket shown in pl. XCIII, 7. This unusual basket was made as a cage for a chicken. As a rule, rough baskets of the usual cylindrical form are utilized for this purpose, the opening being closed by binding its edges tightly together with a pitigua cord. This bottle-shape basket was the only one of its kind encountered, and no Cayapa name was given for it.

BASKETRY HANDLES

285 Most of the ordinary cylindrical baskets of small or medium size, regardless of technic, are provided with handles or bails such as those shown in pl. XCII, 3, and XCIII, 4. These handles are always of pitigua and are made in several forms.

The simplest handle consists of a plain piece of pitigua of the proper length, usually unsplit, tied at diametrically opposite points through the border of the basket. Usually it is passed through and brought up far enough

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The cotton ordinarily grown in this section is of a brownish color, and it is claimed by the Cayapa that this is indigenous. It must be said, however, that brown cotton rarely grows wild along the river or in the mountains, but is seen almost exclusively about inhabited places or the sites of recently abandoned habitations.

The second variety of cotton is pure white and is also grown by the Cayapa to a limited extent. It is maintained that this is not a native plant, but is a direct importation from the mountain region or from the Rio Esmeraldas territory. In fact, this white cotton is now sometimes purchased by the Cayapa in their trips to the Rio Esmeraldas, because so little of it is grown along their own river.

When the cotton bolls open and the seeds with their covering of fine fibers are almost ready to drop, they are gathered and, if necessary, dried. The contents of two of these fully opened bolls are shown in pl. CVII, 11. It is frequently desirable to store the cotton away in this form for some time, in which event a considerable number of the bolls are made up into a package which is wrapped with a leaf or two of hoja blanca. Such a bundle is usually tied with a piece of pitigua and in this form may be stored for an indefinite period. In the bundle shown in pl. CVII, 12, a section of the wrapping has been torn away in order to show the contents. When it is desired to prepare the cotton for use, the bolls are cleaned of the seeds and of any foreign matter that may have become mixed with the fibers, since the presence of any foreign substance interferes materially with spinning. In this

3: Barrett E-5 (1908-1909)1925
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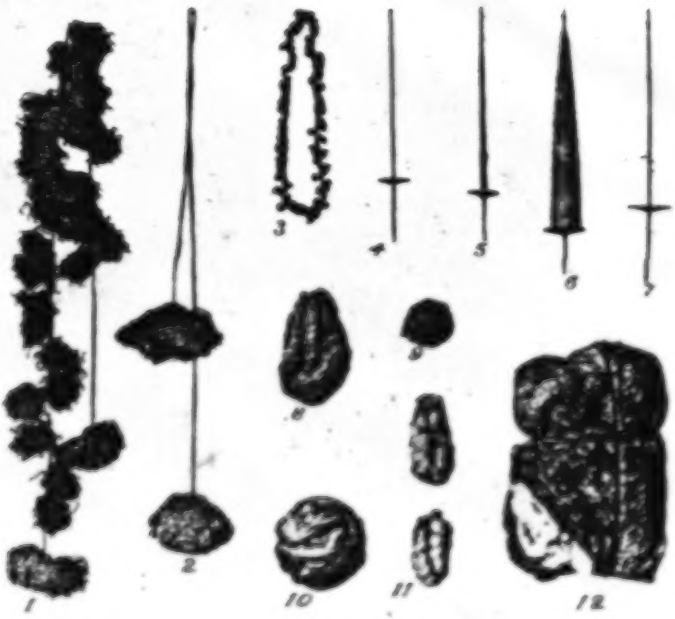

GIRDLES, FILLET, AND SPINNING MATERIALS

[p. 252 (A)]

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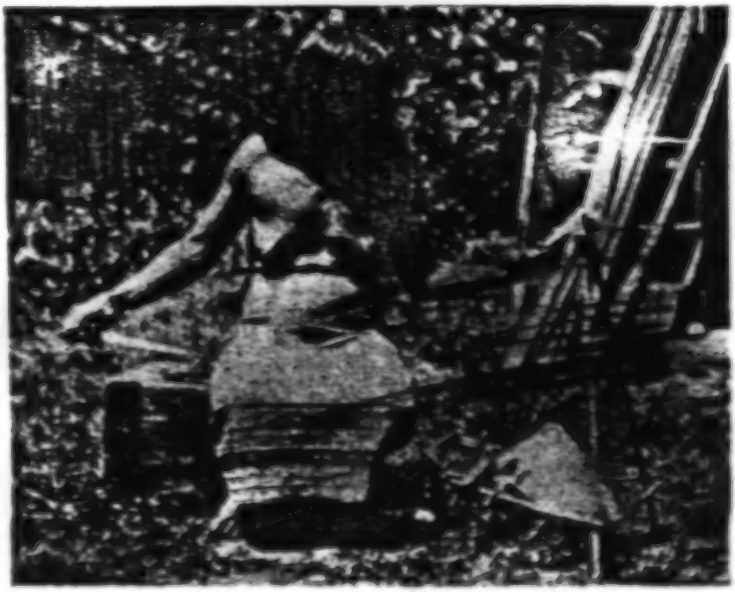

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SPINNING (1) AND WINDING (2) COTTON THREAD

[p. 252 B]

3: Barrett E-5 (1908-1909)1925
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cleaning process the fibers attached to a single seed may be disengaged from all the rest and flattened into a small, irregular, and very thin layer. These bits are later placed together and their edges overlapped in such manner as to form a very thin sheet of perhaps three by six inches. On the other hand, the contents of a single boll, comprising perhaps from a dozen to twenty seeds, may be separated together, in which case the resultant sheet of cotton is of about the same size as that mentioned. 283

These thin sheets are next laid away until a sufficient number is accumulated to make a roll. Each sheet is then worked over a second time to insure the absence of any particle of foreign substance. In this process each sheet is worked until it is so thin as to be transparent. The sheets also become very much larger, reaching usually about ten by fifteen inches in size. They are then carefully laid one upon another and pressed firmly together with the hands, care being taken that all parts adhere. The thickness of such a mat or wadding is about half an inch. This is then rolled crosswise into a cylinder about ten inches in length and from two to four inches in diameter. The cotton is now ready for spinning and is bound by one end of the roll to the top of a tripod spinning stand, called kō *te*'le (pl. CVIII), or to a vertical pole if such a stand is not available.

Spinning is done upon a spindle (pl. CVII, 4–7), called kûtcū'a. It consists of a long, very slender shaft, called pī'tya'lyī, of palm-wood, and a discoidal whorl called pī''pōka, of coconut shell or of hard wood, and

3: Barrett E-5 (1908-1909)1925
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283 usually an inch and a half to two inches in diameter. The shaft itself is from ten to fourteen inches in length, but is usually no thicker than a large knitting needle. The spindle-whorl is ordinarily at a point about two or three inches from the lower end of the shaft, and it is this portion which is twirled by the thumb and fingers of the right hand. The thread is spun upon the longer end of the shaft. Frequently a piece of spun thread is wound tightly about the middle portion of this longer end of the shaft, as is shown in pl. CVII, 7. This is done in order to insure a firm hold for the thread during the spinning process.

The fibers of cotton always feed into the thread from the bottom of the roll, and in commencing to spin from a new roll a few fibers are worked from the outer lower corner of the sheet of cotton which forms the roll and are attached by pressure to the thread which is wound tightly onto the spindle shaft as above mentioned. As a result of the rotary motion of the spindle, these fibers are twisted together to form the thread, and, as they twist, the pulling of the spindle away from the roll of cotton causes other fibers to feed into the thread.

Having in this way started a few inches of the thread, it is manipulated with the left hand in such manner as to produce an even thickness by allowing it to pass between the first and second fingers which are made to exert a slight tension upon it, and by rolling it between the thumb and third finger in such a way that these combined actions pull where the thread is thick and allow it to pass freely through the fingers where it is thin. It is thus brought to a uniform size. This passing of the

3: Barrett E-5 (1908-1909)1925
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thread between the first and second fingers serves also 283
to prevent the fibers from feeding too rapidly, since a sufficient tension is kept upon them to regulate the amount of cotton which passes on to the rolling and final forming of the thread between the thumb and third finger, where it is reduced to its final and uniform size. Now and then an exceptionally thick place appears in the thread as it is formed, owing to an irregularity in the tension exerted by the first and second fingers or to some irregularity in the rolling between the thumb and third finger. In such a case the twirling is stopped, the left hand is slipped farther back on the forming thread, and the thick portion is rolled and pulled out until it is of the proper thinness. In pl. CVIII are shown two stages in the process of spinning. In fig. 1 the position of the hands during the actual twirling of the spindle and the regulating of the forming thread are shown. In fig. 2 the spinner is shown winding a section of finished thread on the spindle.

The twirling of the spindle is done with the right hand and in one of two ways: It may be twirled with the thumb and third finger, a notch formed by the ends of the first and second fingers being used as a support for the spindle; or it may be twirled with the thumb and first finger, in which case a notch formed by the ends of the second and third fingers is used as a support. In either case the thumb is held stationary and the rotary motion of the spindle is produced by rolling the first or end joint of the opposing finger against the ball of the thumb. In this manner a rapid rotary motion is given the spindle, which process, aided by the slow feeding

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•283 in of the fibers with the left hand, causes a fine and tightly twisted thread to be formed.

As the fibers are fed into the thread and it gradually lengthens, the right arm is extended farther and farther from the body and the spindle moves farther and farther away from the roll of cotton. At last, having reached a point where it becomes inconvenient to rotate the spindle, the motion is stopped, the angle between the thread and the spindle is changed so that the thread is nearly at a right angle to it, and the thread is unwound for a few turns, since in spinning it naturally winds out to the extreme point of the upper end of the spindle. The motion is now reversed and the full length of the thread to the point of completion is wound on the spindle, thus bringing the left hand again near the point of the spindle and permitting another section of thread to be fed to it. In winding the finished thread on the spindle the worker begins near the spindle whorl and winds it gradually upward along the shaft. In this manner the wound portion of the shaft gradually increases and approaches the point so that, when the spindle is full, a cone of thread with a base equal to the diameter of the whorl and a length equal to the full length of this portion of the shaft is formed.

In case it is necessary to discontinue spinning, the thread is simply disconnected from the roll of cotton by pulling loose the fibers at the point where the twist in the thread is complete. This leaves a small tuft of projecting untwisted fibers on the end of the thread. To resume spinning, it is necessary only to place these loose fibers on the roll of cotton and give them a slight twist.

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As above mentioned, the fibers are fed into the thread from the bottom edge of the roll of cotton, which feeds the fibers evenly from one end of the sheet to the other. Thus, by beginning at the outer corner of the lower edge of the sheet and feeding the fibers evenly into the thread as they come from along the line of the coil made by this lower edge, the opposite end of this edge is reached. This point is at the center of the bottom surface of the roll of cotton, and when it is reached the direction of the pull of the thread is reversed so that it follows this coil back to the outer surface of the roll where its direction is again reversed and the original path is followed to the center of the coil. In this manner the fibers are not drawn from one side more than from another, hence the roll of cotton remains constantly cylindrical and is simply shortened evenly until completely exhausted. 283

Having thus filled a spindle, it is usually placed in one of the long spindle baskets (pl. XCIII, 8, 12) until such time as several spindles have been filled and it is desired to wind the thread into balls. Such a ball is illustrated in pl. CVII, 10. [415]

In order that the thread may unwind readily from the spindle, this is held between the great and second toe of each foot. The short portion of the spindle shaft below the whorl is usually placed between the toes of the left foot, the opposite end of the shaft resting between the toes of the right foot. In this manner a reel is formed and the thread unwinds easily.

Thread is almost always stored in balls. The white and the brown thread is usually kept in balls from three to five inches in diameter. The green and the lavender

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thread may also be wound into large balls, but because much smaller quantities of these colors are used the balls are usually smaller. Likewise the red and the blue woolen thread, which is obtained by trade through Indians of the interior mountain region, comes in balls an inch or two in diameter, such as the ball of red woolen yarn shown in pl. CVII, 9.

Threads of four native colors are used by the Cayapa. Two of these, the white and the brown, are the natural colors of the two species of cotton. The lavender is made by dyeing with a pigment obtained from a univalve procured at the ocean, while the green is produced by a dye obtained from the leaf of a small shrub resembling the locust of the temperature zone. In addition to these native colors the red and blue woolen threads obtained through trade with the Indians of the interior are used. In dyeing the cotton either lavender or green it is wound into short skeins, the winding being usually done upon the great toe of one foot and the thumb of the left hand as turning points. Another method is to drive two wooden pegs into a section of plantain or other succulent stem and wind upon these. The skein thus formed is tied at the two ends near the pegs to prevent it from becoming tangled. It is then slipped off the pegs and placed in the dye, and by rubbing and thoroughly working the dye into the skein, an even as well as a fast color is finally obtained. The skeins are then laid out to dry and are later wound into balls and stored away. Pl. CVII, 8, shows one of these skeins after the dyeing is completed.

Dyes of only two other colors are used by the Cayapa.

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One is a jet black obtained by boiling the bark of a certain tree, and is used almost exclusively in the dyeing of old mantas or other pieces of cloth. The other is the red obtained from the achote and is used on rare occasions for coloring the material used in certain baskets and fans.

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WEAVING

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Weaving is always done upon a crude, though fairly elaborate, loom consisting of twelve essential parts. In pl. CIX is shown a photograph of one of these looms as it appeared in use in a Cayapa house. This shows the parts of the loom to fair advantage, but they are even more clearly shown in pl. CX. These parts are as follow:

Lateral uprights, *a*, *b*	= a′ipala
Cross-bars of frame, *c*, *d*	= tyūnlū′ra
Warp guides, *e*, *f*	= ya′ipe
Weaving batten, *g*	= tsē′hwa
Shuttle, *h*	= pī′picalyī
Warp separators, *i*, *j*	= yade′mbū
Head bar, *k*	= yade′mbū
Head stick to which the initial line of weaving is fastened, *l*	
Width gauge, *m*	= ityu′lya

The lateral uprights (*a*, *b*) are two long and comparatively slender poles. One end of each is forked, and each point of the fork is sharpened to a chisel edge. The points of each of these poles are forced through one of the narrow cracks in the palmwood floor of the house and across one of the joists below. The upper end of the pole is bound securely to one of the beams of the house,

3: Barrett E-5 (1908-1909)1925
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since such weaving is done in large measure only at odd times.

The trunks or mocho (pl. CXVI) worn by the men is made of cloth woven by the women, a special narrow fabric being produced for this purpose. One of these pieces of cloth contains enough for two mochos. It is always cut and sewed by the men themselves, some of them being adept with the needle. The women know almost nothing about sewing. It ordinarily even falls to the men to make the small mochos for the boys until they are old enough to sew for themselves.

The subject of manta designs is treated under Decorative Art.

CORDAGE AND NETTING

In most cases cordage and nets are made of the fine, long, white fibers obtained from the leaf of the plant called in Spanish pita and in Cayapa sa′nō, and to a much more limited extent the fibers from the bark of a tree called in Spanish cosadera and in Cayapa señgī′lya are used.

The preparation and manipulation of pita, to which reference has been made hitherto, are quite elaborate. The long, slender, full-grown leaves of the plant are cut off close to the ground and brought to the house in bundles, such as those shown leaning against the house in pl. LXVI. While the leaf is still green the fibers are extracted by first scraping off the succulent portion of the concave side of the leaf and then stripping out the fibers from the remainder. For this scraping there are required a semi-cylindrical log of palm-wood, called sañwi cī′nō,

3: Barrett E-5 (1908-1909)1925
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and a double-edged shaving knife, called sañwi'ctcīpapa. The log is half of a nine or ten foot section of a trunk of the pambil palm. Its flat side is leaned against one of the horizontal beams that compose part of the superstructure of the house, at an angle of about twenty degrees with the perpendicular and about midway between two vertical poles the tops of which are bound to the opposite or outer surface of the beam. These poles, which are usually the forked ones used to support the loom, are placed about two feet and a half apart. At a height of six or seven feet from the floor a piece of pitigua is bound to the two poles and so placed that it passes horizontally across the curved surface of the log. A second piece of pitigua is tied horizontally and at a level also about six or seven feet from the floor, but at a distance of several feet toward the interior of the house.

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The pita leaves are now sorted according to length. Six or eight leaves are then piled neatly one upon another, bottom uppermost. This bunch is bent double and passed behind the pitigua cord that runs directly across the log; the cord presses the leaves at their fold tightly against the log, holding them in place during their manipulation. The leaves are always placed so that the concave side of each is uppermost and so that at first the bases of the leaves hang down against the log. The upper half of the bunch of leaves, and also those individual leaves of the lower half which are not actually in use, are kept out of the way by being passed up over the cord above mentioned, which is stretched at some distance from the log.

Beginning now with the base ends of the leaves, the

3: Barrett E-5 (1908-1909)1925
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283 lowest one in the bunch is brought down on the convex surface of the log, and with the corner of a knife the succulent outer layer is split throughout the length of the section of the leaf exposed. This allows the leaf to be easily flattened against the log so that the succulent layer may be scraped off with one of the edges of the knife (fig. 25).

283 413 [824] The knife used for this purpose is illustrated in pl. CXVII, 2. It is usually made from half of a section of wild cane (Spanish caña brava), and is ordinarily from fifteen to eighteen inches in length. The soft center of the cane is hollowed out so that only the hard, woody portion of the outside of the stalk remains. The two edges of this semi-cylindrical section are very sharp, thus producing a serviceable implement.

283 The succulent portion of the leaf having been scraped off and the fine fibers exposed to a length of eight or ten inches at the base of the leaf, the fibers are loosened with a thumb or finger nail and are then split loose as far up the leaf as the scraping has progressed by pulling them gently outward. A slit is then made in this scraped section and the loosened fibers are passed through and looped (fig. 25) in such manner as to prevent them from becoming tangled as the scraping proceeds farther up the leaf. When this half of the leaf is completely scraped, it is hung at the side of the pole and the corresponding portion of the next leaf is scraped.

Finally, all the lower halves of the leaves having been scraped, the upper halves which had been placed overhead are brought down upon the log and held in position by means of the horizontal cord which secured the lower

3: Barrett E-5 (1908-1909)1925
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halves. This is done by bending over a section about a foot long at the extreme tip of the bunch of leaves. The

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FIG. 25.—Pita fibers tied to prevent tangling

upper halves of the leaves are then scraped as described. Finally each leaf is separately reversed, the scraped por-

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283 tion being passed back over the shoulder, and the last foot of the tip of the leaf is held in place upon the log with the left hand. With the knife held in the right hand, its surface is scraped the same as that of the remainder of the leaf. The leaves are then taken from the pole and the fibers carefully stripped off with the hands. The fibers from each leaf are coiled up separately and the coils are later taken to the river and thoroughly washed to remove what pulp and juice remain. The product is a set of light-green fibers which are placed in the sun to dry and bleach, and finally are combined into large bundles or skeins which are stored until needed. Such a set of fibers is first doubled and the halves are lightly twisted together, producing a long, slender skein such as that shown in pl. CXVIII, 1. This is again doubled and lightly twisted, and even a third doubling and twisting may be employed to make the skein of the desired length.

In preparing the fibers for making string, one end of a bundle of them is tied to an upright support, and the fibers of the loose end of the bundle are combed with the fingers to remove any short and useless ones and to bring the long ones parallel. These long fibers, still tied in the bundle, are then selected according to the kind of string desired, and are made into loose plies by first twisting them with the fingers and then by rolling them upon the calf of the right leg. This results in a bundle of plies such as that shown in pl. CXVIII, 2. When all of the bundle of fibers has been treated in this manner, the plies are selected in pairs and twisted together by grasping a pair of plies in the left hand so that the first finger passes

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PITA FIBERS, PLIES, AND CORDS

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TROT-LINE, BUNDLE OF PITA FIBERS, AND CORDAGE

[p. 278 (2)]

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between the two; they are then rolled simultaneously with the palm of the right hand upon the calf of the right leg in order to twist each separately. They naturally twist together beyond the left hand by virtue of the tortion in the separate plies, but at frequent intervals are pulled apart, since each must be thoroughly twisted separately before the two are allowed to twist themselves together to form the string. At last the finger which has been used to separate the plies is withdrawn and the rolling motion is reversed, so that the hand is drawn toward the body instead of moving from it. This reverse motion, combined with the individual tortion in each ply separately, serves to twist the two plies together in the opposite direction to that of the individual twist of each ply and to form a firm and strong string. The twisting of such a lot of plies results in a bundle, or what may be termed a skein, of cords such as that shown in pl. CXVIII, 3. All string is two-ply, its size being governed by the quantity of fiber used for each ply and by the use for which it is intended.

A large number of fibers are obtained from each leaf, and a considerable number of strings, each as long as the leaf, result from the twisting process. In one case, for example, four leaves yielded sixty-four fine cords such as are used for weaving the conical casting net. The length of each of these cords was about fifteen feet.

In twisting cords in the manner described, care is taken that they do not become tangled. Accordingly when a considerable number of cords have been twisted they are divided into three approximately equal groups which are then braided. As the work progresses and

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283 several other cords are completed, these are added to the braids at the ends. Thus by adding group after group of these braids, when the whole bundle of cords is completed and both its ends are braided it forms a skein of cords which appears like that shown in pl. CXVIII, 3. The skein is kept in this form and the individual cords are extracted from its middle. This tends to pull backward and to loosen the braids at the two ends of the bundle and thus easily to free the ends of the individual cord from the braids.

[824] The other kind of string obtained from the bark of the tree called in Spanish cosadera and in Cayapa señgī'lya, is made in a manner similar to that employed in making pita string. The fibers used in making this string are obtained by beating out the bark by the method employed in making bark cloth. After being washed, as in the case of bark cloth also, these fibers are dried, folded, and bound into bundles (pl. CXIX, 2). When needed, the sheets are taken from the bundle and the fibers are separated and twisted into a heavy and rather loose cord which serves very well for making a hammock or as the main cable of a trot-line (pl. CXIX, 1), but otherwise is little used. The string bears the same Cayapa name as the tree itself, and its primary use is for hammocks, which are woven with the same technic as are fish-nets, shortly to be described. The meshes are, however, extremely large and are made without the aid of a mesh-stick, being kept sufficiently even by the eye alone.

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The Cayapa do not splice cords by twisting together the fibers at their ends, as is done by some Indians. An individual pita cord is usually from ten to sixteen feet